



PERSIVAL

a System for Personalized Search and Summarization over Multimedia Information

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Accomplishments

Development of prototype system components

† Question interface

- † within the clinical context

† Search

- † heterogeneous, patient specific and multimedia

† Presentation of patient relevant results

- † Document summarization

- † Term definition

- † Video summarization



Search: distributed resources

- † Resources lack uniform search capabilities
- † Metasearcher enables virtual integrated view of heterogeneous sources
 - † SDARTS: SDLIP and STARTS
 - † Columbia's search team has installed and deployed Stanford's WebBase client, successfully receiving and indexing web "feeds" from Stanford
 - † Toolkit for indexing local collections and wrapping external collections
- † Machine learning techniques to classify collections into topic categories for browsing



Re-ranking Search Results

- † Filter out relevant documents that do not match the patient record
- † Natural language techniques to analyze documents and patient records
 - † Represent documents and records as lists of technical terms with values (base heart rate **over 90**; **severe** unstable angina)
 - † Convert terms to semantic concepts
- † Match document semantic concepts against patient record concepts



A Matching Patient Record and Journal Article

Patient Record

This is a 44 year old female past medical history of coronary artery disease, status **post myocardial infarction** in 1983, status post **CABG** in 1989 [...] The patient was admitted to New York Presbyterian Hospital on 12/3/99 [sic] a worsening CHF and **unstable angina** for evaluation for heart transplant.

Medical Article:

This was a multicenter prospective study of consecutive patients admitted to coronary care units with **unstable angina**. Baseline characteristics were age 60.18+-16 years, history of **prior myocardial infarction** in 336 patients (32%)[...] In-hospital treatment consisted of [...] angioplasty or **coronary artery bypass grafting (CABG)**... in 25.1%.



Summarization of Retrieved Documents

- † Allows users to understand key information in documents and determine relevance
- † Methods depend on genre
 - † journal articles for clinicians
 - † consumer health information for patients
 - † echocardiogram video for clinicians
- † Summaries augmented with definitions of unknown terms automatically acquired from online text resources

Generated Summary on Angina

Overview summary of

Synopsis: Treatment is designed to prevent or reduce ischemia and minimize symptoms. Angina that cannot be controlled by drugs and lifestyle changes may require surgery. Angina attacks usually last for only a few minutes, and most can be relieved by rest. Most often, the discomfort occurs after strenuous physical activity or an emotional upset. A doctor diagnoses angina largely by a person's description of the symptoms. The underlying cause of angina requires careful medical treatment to prevent a heart attack. Not everyone with ischemia experiences angina. If you experience angina, try to stop the activity that precipitated the attack.

Get more detailed information the section: [[variant angina](#) | [what is the treatment ?](#) | [diagnosis](#) | [diagnosis](#) | [SIGNS AND SYMPTOMS](#) | [what are the symptoms ?](#) | [treatment](#)]

Highlighted differences between the documents:

- This file ([5 minute emergency medicine consult](#)) is close in content to the summary.
- More information on additional topics which are not included in the summary are available in these files ([The American Medical Association family medical guide](#) and [The Columbia University College of Physicians and Surgeons complete home medical guide](#)). The topics include "definition" and "what are the risks ?".
- [The Merck manual of medical information](#) contains extensive information on the topic.

Angina - the chest pain that occurs when the heart is deprived of oxygen due to diminished blood flow



Static Summary of Echo Video

- *A typical storyboard summary of an echo video.*
- *Each view of the echo video is represented by its key frame, a place holder for the video.*



